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THE PROFILES OF DIZZY PATIENTS IN EMERGENCY DEPARTMENT, HOSPITAL UNIVERSITI SAINS MALAYSIA (HUSM): A RETROSPECTIVE STUDY

By

NOR FAEZAH BINTI ZAINON

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CERTIFICATE

This is to certify that the dissertation entitled

"THE PROFILES OF DIZZY PATIENTS IN EMERGENCY DEPARTMENT, HOSPITAL UNIVERSITI SAINS MALAYSIA (HUSM): A RETROSPECTIVE STUDY"

is the bonafide record of research work done by

Nor Faezah binti Zainon

during the period from September 2016 to June 2017 under my supervision

Main Supervisor,	Co-Supervisor,
……	……
Dr. Zuraida Zainun	Dr. Shaik Farid Abdull Wahab
Lecturer	Lecturer
School of Health Sciences	Emergency Department
Universiti Sains Malaysia	Universiti Sains Malaysia
16150 Kubang Kerian	16150 Kubang Kerian
Kelantan	Kelantan
Date:	Date:

TABLE OF CONTENT

DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated and duly acknowledged. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at Universiti Sains Malaysia or other institutions. I grant Universiti Sains Malaysia the right to use the dissertation for teaching, research and promotional purposes.

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(NOR FAEZAH BINTI ZAINON)

Date:.....

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LIST OF ABBREVIATIONS AND SYMBOLS

HUSM	Hospital Universiti Sains Malaysia
VOR	Vestibular-Ocular Reflex
EARS	Ear Associates and Rehabilitation Services
BPPV	Benign Paroxysmal Positional Vertigo
VNG	Videonystagmographgy
CT	Computerized Tomography
MRI	Magnetic Resonance Imaging
ENT	Ear, Nose and Throat
UMMC	University Malaya Medical Centre
PVD	Peripheral Vestibular Disease
RV	Recurrent Vestibulopathy
ORL-HNS	Otolaryngology-Head and Neck Surgery
MD	Meniere's Disease
VN	Vestibular Neuritis
VL	Vestibular Labyrinthitis
ORL	Otorhinolaryngology
SPSS	Statistical Package for Social Sciences

%	Percentages
URTI	Upper Respiratory Tract Infection
WHO	World Health Organization
A&E	Accident and Emergency
SD	Standard deviation

List of figures

List of tables

THE PROFILES OF DIZZY PATIENTS IN EMERGENCY DEPARTMENT, HOSPITAL UNIVERSITI SAINS MALAYSIA (HUSM): A RETROSPECTIVE STUDY

ABSTRACT

Dizziness is a general term that is used to describe spinning sensation, light-headedness, off-balance and postural instability. Dizziness is common complaint during healthcare visit in emergency department and outpatients clinic. Many patients are affected by dizziness as it reduces the quality of life by having an impact in their well being and work productivity. There are four types of dizziness which are vertigo, presyncope, disequilibrium and others. This retrospective study was carried out to study the profiles of dizziness patients in emergency department, HUSM for 3 months (June –August 2016) duration. The findings were obtained by reviewing the medical records of dizzy patients who came to emergency department HUSM, which will eventually be used as a preliminary data that would establish a better awareness and management in handling dizzy patients. We managed to acquire 106 patients that comprises of female gender, that was dominating the number of dizzy patients by 60 (57%) cases, compared to male with 46 (43%) cases.The subjects are from two races, which are Malay(96%) and Chinese (4%). The age group of 50 until 60 years old had the highest number of dizziness cases with the percentage of 35%. Vertigo has the highest percentage(63%), followed by presyncope(30%), disequilibrium(6%) and lastly, others(5%). The result also showed that both recent Upper Respiratory Tract Infection (URTI) and positional related was the most factor that aggravate dizziness. Majority of the dizzy patients did not experience falls by 74% from the overall subjects. In summary, this study is parallel with other research and a bigger sample size in the future would be better result.

Keywords: Dizziness, Disequilibrium, Emergency department, Prevalence, Presyncope, Vertigo

PROFIL PESAKIT PENING DI JABATAN KECEMASAN, HOSPITAL UNIVERSITI SAINS MALAYSIA (HUSM): SEBUAH KAJIAN RETROSPEKTIF

ABSTRAK

Pening ialah satu perkataan umum yang digunakan untuk menggambarkan rasa berpusing, ringan kepala, ketidakseimbangan dan postur yang tidak stabil. Pening juga adalah aduan yang selalu dialami oleh pesakit yang datang ke pusat rawatan sama ada di Jabatan Kecemasan dan Klinik Pesakit Luar. Ramai pesakit terkesan dengan masalah pening kerana ia mengurangkan kualiti hidup dengan memberi kesan kepada kesejahteraan dan produktiviti kerja mereka. Terdapat empat jenis pening, iaitu vertigo, kepitaman, ketidakseimbangan dan lain-lain. Tujuan kajian retrospektif ini dijalankan adalah untuk mengkaji profile pesakit pening di Jabatan Kecemasan, HUSM untuk tempoh 3 bulan (June-August 2016).Data diperoleh dengan membaca folder perubatan pesakit pening yang datang ke Jabatan Kecemasan dan seterusnya akan digunakan sebagai data awal bagi mewujudkan kesedaran dan pengurusan yang lebih baik dalam menguruskan pesakit-pesakit pening. Kami berjaya mendapatkan 106 subjek yang terdiri daripada wanita yang mendominasi pesakit pening dengan 60 (57%) kes, dibandingkan dengan lelaki dengan 46 (43%) kes. Subjek adalah dari kaum Melayu (96%) dan Cina (4%).Kumpulan umur dari 51 hingga 60 tahun mempunyai jumlah pesakit pening paling ramai dengan 35 peratus. Vertigo mempunyai peratusan yang tertinggi (83%), diikuti dengan kepitaman (30%), ketidakseimbangan (6%) dan akhir sekali, lain-lain (5%). Data juga menunjukkan kedua-dua faktor jangkitan saluran pernafasan dan kedudukan merupakan faktor yang paling banyak mencetus kepeningan. Kebanyakan pesakit pening tidak mengalami masalah jatuh dengan 74% daripada

keseluruhan subjek. Sebagai ringkasan, kajian ini selari dengan kajian-kajian yang lain dan saiz sampel yang lebih besar patut digunakan pada masa hadapan untuk keputusan yang lebih baik.

Kata kunci: Pening, Ketidakseimbangan, Jabatan Kecemasan, Kelaziman, Kepitaman, Vertigo

CHAPTER 1

1.0 INTRODUCTION

1.1 Background of study

Having an intact and good balance system of our body would surely enable us to live a normal life and able to carry out our daily activities without any problem. Unfortunately, there is a significant numbers of patients who have balance disorder and the number is increasing. In the United States of America, approximately 20% to 30% of elderly persons experiences problems with dizziness or balance (Lin and Bhattacharyya, 2012) (Wetmore *et al.*, 2011). " Balance disorder is known as a condition where a person experiences unsteady, giddy, woozy, or have a sensation of movement, spinning, or floating " (National Institute of Deafness and Other Communication Disorder, 2014). Duration are varies that can last from seconds, minutes, hours, more than one day and in certain patients, they will experience the attack daily (Neuhauser *et al.*, 2001) & (Waterston, 2004).

1.2 Overview Balance System

Balance is the ability to maintain body's center of mass over its base of support (Shumway-Cook and Woollacott, 2001). A properly functioning balance system would enable us to see clearly what is moving through vision, maintain our position and make adjustment to maintain posture and stability in various circumstances. Balance system are maintained by a complex set of sensorimotor control system that involves sensory input from visual, proprioception, vestibular system, integration of sensory input as well as motor output to eyes and sensory muscles. Factors like injuries, diseases, certain drugs and also aging process can affect one or more component of body balance. In addition, there is also psychological factors that can impair our sense of balance.

1.2.1 Sensory input in Balance system

According to Vestibular Disorders Association in 2017, our balance body system maintains its function by receiving information from 3 peripheral sources, which are eyes, muscles and joints as well as the vestibular organs. All these three sensory information will be picked up the receptors and will be sent to the brain in the form of nerve impulse.

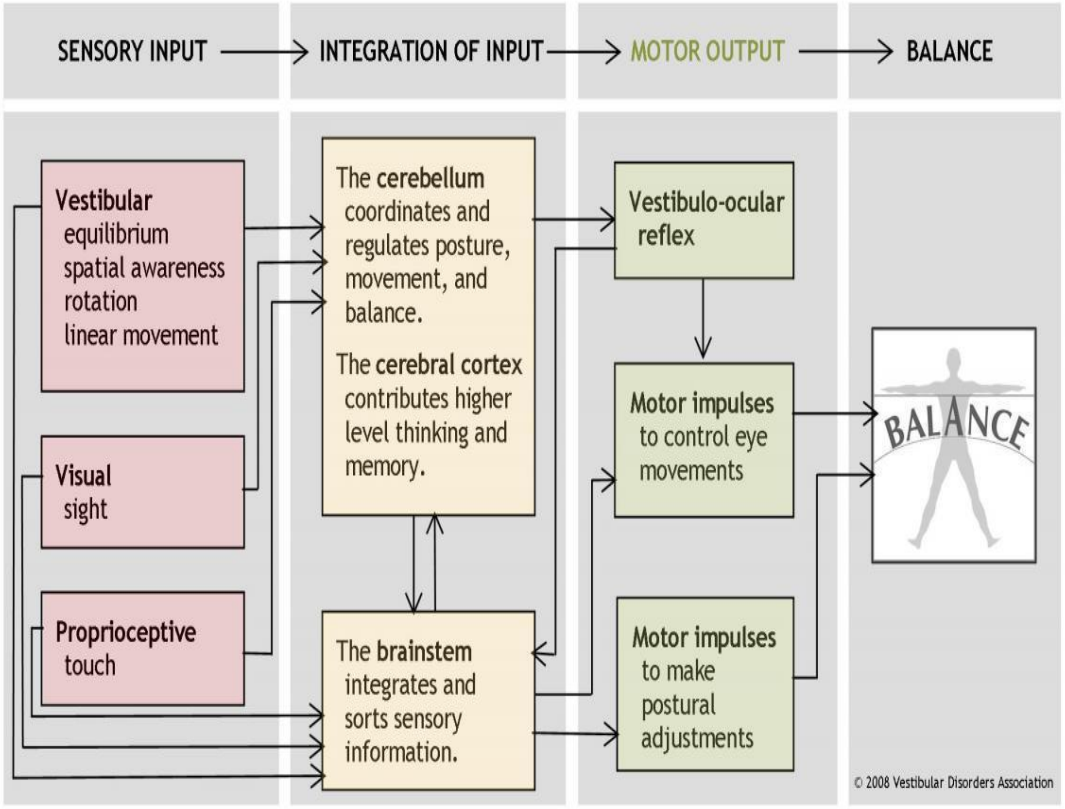

Figure 1.1: The complex sensorimotor control of balance body system

Retrieved October 16, 2016 from: http://vestibular.org/understanding-vestibular-disorder/human-balance-system

1.2.2. Integration of Sensory Inputs

Balance system receives sensory information from the peripheral sensory organs such as eyes, muscles and joints as well as our vestibular organ. These information was sent in the form of nerve impulse to the brain. The information then would be sorted and integrated with learned information contributed by the cerebellum and the cerebral cortex. Cerebellum provide information about automatic movement that have been learned through repeated exposure to certain motions. On the other hand, cerebral cortex provides previous learned information. For example, the ability of an individual to change the type of movement on a slippery floors in order to avoid from falling down. After integration of sensory information has been completed, motor outputs would be sent via nerve impulses to the eyes, head and neck, trunk and also legs in order to maintain the body balance system (Vestibular Disorders Association. 2017).

1.2.3. Motor Output to Muscle and Joints

Nerve impulses are sent from sensory receptors to brain via nerve pathway and the se impulse eventually would be processed. An action or motor output occur as a result of the integration of the sensory information and a new pathway would be formed. Once these pathway reach effectors such as the muscle and joints of legs, an action of movement would be made to maintain the orientation of our body (Vestibular Disorders Association, 2017).

1.2.4. Motor Output to the Eyes

The vestibular system sends motor control signals via nervous system to the muscle of the eyes with the automatic function, which is called vestibular-ocular reflex (VOR). When the head is at a static position, the number of impulses in the vestibular organ of the right side is equal with the vestibular organ on the left side. However, when one person moves to the right, the number of impulses of the right side are increasing while the impulses in the left side are decreasing. The difference in the number of impulses in each side controls the eye movement and stabilize the gaze during both active and passive head movement (Vestibular Disorders Association, 2017).

1.2.5. The Coordinated Balance System

The human balance body system involves a complex set of sensorimotor control pathway. These complexity creates challenges in diagnosing and treating the underlying cause of imbalance. The crucial information obtained through vestibular, visual and proprioception system are necessary in order to maintain an intact balance system. Any disruptions like injury, disease or even ageing process can greatly affect our body balance.

These complexity of various factors that are involved in maintaining an intact balance body system creates a challenge among health professional in order to diagnose and treat the cause of imbalance problem in patients. All components starting from sensory inputs, proprioceptive system, visual inputs, vestibular functions and also motor control need to be considered in managing this dizziness problem (Vestibular Disorders Association, 2017).

1.3 Definition of dizziness

Dizziness is defined as a non-specific complaint of unsteadiness and imbalance which can originate from disorders of many systems including peripheral vestibular system, central nervous system, cardiovascular system, drugs and also psychogenic (Philip and Prepageran, 2009). According to (Sloane *et al.*, 2001) the term dizziness is defined as various sensations that includes giddy or rotational sensation, a loss of balace, the feeling of fainting, the light-headedness, unsteadiness or instability, a tendency to fall and also the feeling of having blackout sensation or everything turning black.

Thus, dizziness is applied to physical, emotional and intellectual disturbances whose common denominator seems to be a loss of order or stability, a disruption of pattern in which the individual is aware of his surroundings and their relation to him, whether this refer to his physical orientation in space, his emotional disequilibrium or intellectual clarity (Evans and Trimm, 1966). Another definition of dizziness is a complex neurologic symptom reflecting a perturbation of normal balance perception and spatial orientation(Newman-Toker *et al.*, 2008a).

According to Hearing and Balance Committee of American Academy of Otorhinolaryngology and Heck and Neck Surgery in a study by Martins TF et al, dizziness is any illusionary sense of movement without real movement in relation to gravity (Martins *et al.*, 2016) . Meanwhile, a study by Raucci et al defined dizziness as an unreal sensation of movement, which in medical term be referred to as a peculiar kind of dizziness that makes you feel as if you or the things around you, are spinning or moving, even though there is no movement (Raucci *et al.*, 2016).

Dizziness can be further subdivided into 4 categories, which are vertigo, presyncope, disequilibrium and others (Philip and Remy, 2001). Each category necessitate different approaches to intervention.

1.4 Causes and Symptoms of Dizziness

There are many factors that can cause balance problem and difficulties. Ear Associates and Rehabilitation Services Incorporation (EARS) have enlisted 4 different types of causes of balance disorder (Ear Associates and Rehabilitation Services Incorporation (EARS), n.d). Few of them are:

1) Peripheral vestibular disease

It is a group of diseases that affects the vestibular organ, which is labyrinth. This group of disease accounts for 66% of a total number of 100 patients in a study by (Philip and Prepageran, 2009) . For example, Benign Paroxysmal Positional Vertigo (BPPV), recurrent vestibulopathy and Meniere's disease.

2) Central vestibular disorder

This type of group comprises a series of disease that is controlled by brain and its connecting nerves. Any disruptions along its pathway such as head injury/trauma, brain tumour, stroke, and brain disorders can greatly affect our balance system.

3) Systemic disorders

This group of diseases involves a number of illnesses that is affecting the body system other than the brain part. Injuries or any problem to the visual or skeletal system would cause a person to lose his or her postural control and stability.

4) Vascular diseases

The last group of disease that can cause balance disorder are diseases that involves our heart. Blood circulation problem, abnormal blood pressure, aneurysm and abnormal heartbeat can also contribute to the balance problems. Besides that, the most common cause of balance problem are medication side effects (11.3%), inner ear infections (11.0%), heart disease(8.6%) and loose ear crystals which was known as otoconia (7.9%) (Roberts *et al.*, 2013) . This was revealed from a population study in 7.02 million elderly patients who reported of balance problem in the United States of America. Another study also revealed that the contributory causes of dizziness among elderly patients who aged 65 years old and above are cardiovascular diseases, peripheral vestibular disease and also psychiatric illness (Maarsingh *et al.*, 2010).

The patients who faced postural instability and balance problem often shows signs like the presence of nystagmus and having symptoms like blurry vision, feeling nausea, vomiting, sensation of spinning, giddy movement, falling or feeling of falling, lightheaded or feeling woozy and also disorientation.

In addition, patients with dizziness usually are having more than one symptom. Few of them are otology symptoms (hearing loss, ear discharge, tinnitus, otalgia, aural fullness) and/or neurological disturbances (diplopia, headache, visual disturbance, dysarthria or dysphagia, paraesthesia, ataxia) or/and general autonomic symptoms (nausea and vomiting, sweating, palpitations) and/or migraine/aura symptoms (visual or olfactory symptoms) (Gnerre *et al.*, 2015).

The symptoms that patient was having also can lead and help health practitioners to rule out the causes of dizziness. This can be further summarized in the flowchart below:

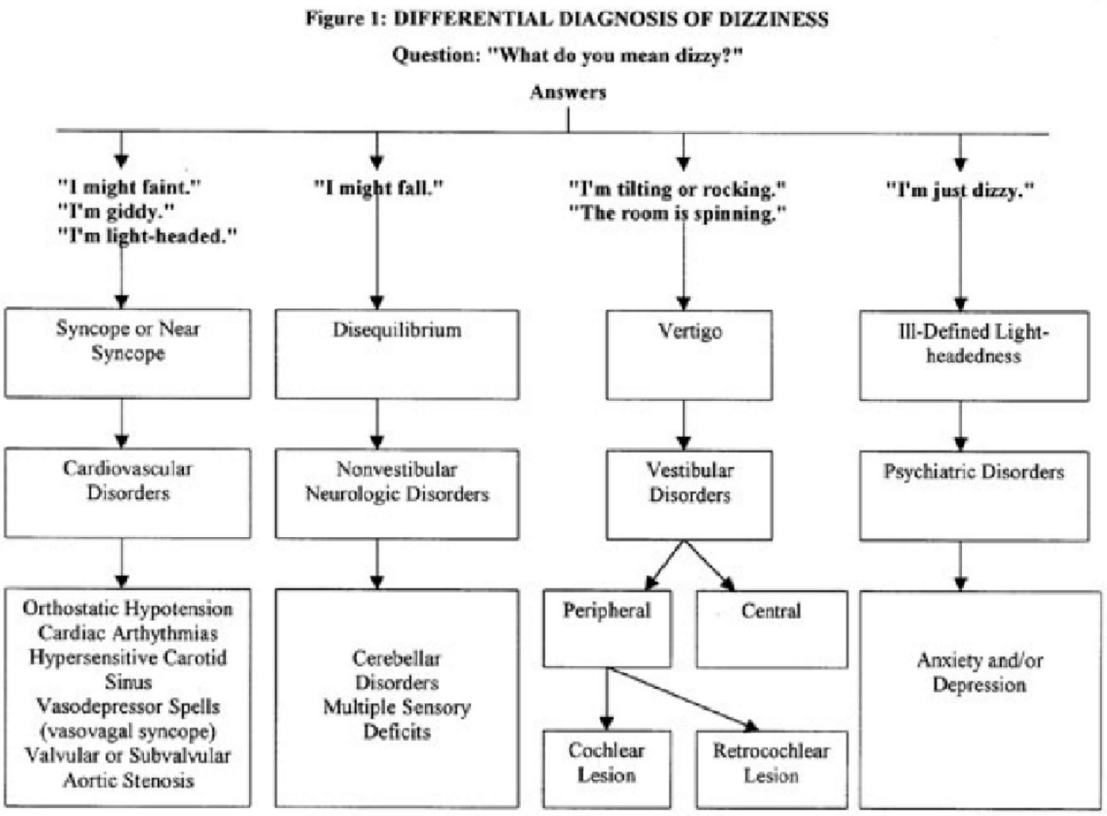

Figure 1.2: Differential diagnosis of dizziness among patients (Samuels and Harris, 2013)

1.5 Assessment and Management

History is the most important component in the evaluation of dizzy patients (Gnerre *et al.*, 2015) . Using information from history taking, we can find out about the nature of the symptoms and signs that the patients are having. Some aspects that need to be addressed in history taking are the main complaint, present illness and comorbidities, past medical history that includes surgical history, medications and also head trauma, family, social and personal history and a review of symptoms.

The next step to be done is to perform a general physical examination that includes vital signs, otology examination and also neurologic examination (ABES *et al.*, 2011). Emphasis should be given in these 3 aspects, which are gait evaluations, cerebellar signs and also cranial nerves examinations (Lee, 2012). Further audiological and vestibular examination should be carried out if necessary. These includes audiometry, videonystagmography (VNG), Caloric Test and also dynamic posturography. Magnetic Resonance Imaging (MRI) and Computerized Tomography (CT) scan should be ordered when central causes are suspected (Philip and Prepageran, 2009).

The flowchart below shows the approach taken in managing patient with dizziness:

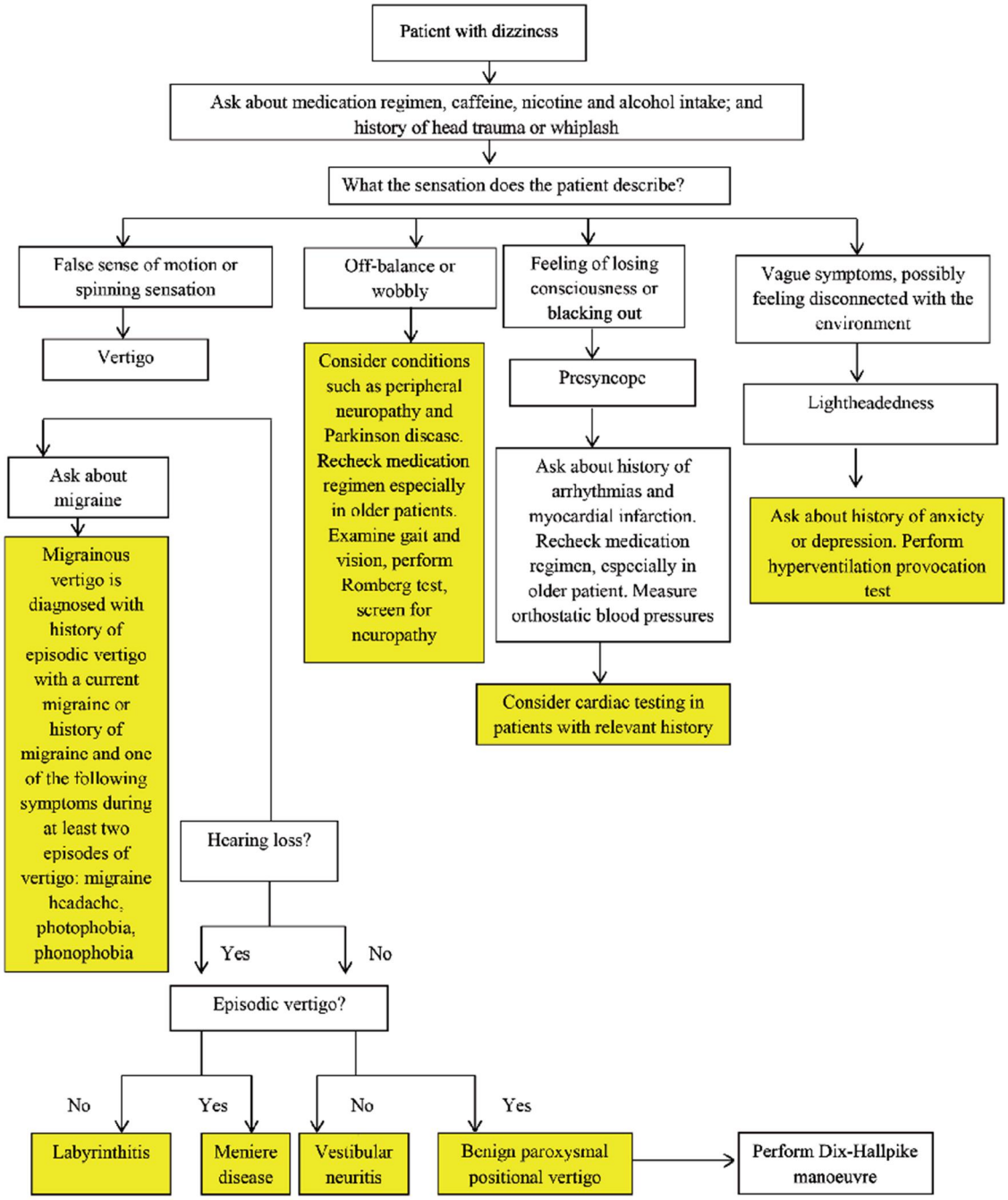

Figure 1.3: Approach in managing dizzy patients

Adapted from: Gnerre, P., Casati, C., Frualdo, M., Cavalleri, M. & Guizzetti, S. (2015). Management of vertigo: from evidence to clinical practice. *Italian Journal of Medicine,* **9(2),** 180-192.

1.6 Problem Statement

Previous study shows that dizziness is an important healthcare issue that need to be given attention as it greatly affect quality of life of the patients. As we all know, fall is one of the common complications among dizziness patients. Unfortunately, there was no research of prevalence of dizziness patients in emergency department yet to be done, especially in Kelantanese population. We know that there is a significant number of dizziness patients who came to emergency department to seek for treatment. Effective and accurate management also have to be done in order to help patients in overcoming the dizziness and vertigo problems. Hence, this study is to be carried out in order to have detailed profiles of dizziness among patients in emergency department, HUSM. Having this detailed and accurate data will improve the awareness and future management of dizziness problem among health professionals and also the community members.

1.7 Research Objectives

1.7.1. General Objective

1) To study the profiles of dizzy patients in emergency department, Hospital Universiti Sains Malaysia, (HUSM)

1.7.2. Specific Objectives

1) To determine the sociodemographic factors among dizzy patients in emergency department, HUSM

2) To determine the type of dizziness among dizzy patients in emergency department, HUSM

3) To determine the associated factors of dizzy patients in emergency department, HUSM

4) To determine the history of fall among dizzy patients in emergency department, HUSM

5) To determine the diagnosis of dizzy patients in emergency department, HUSM

CHAPTER 2

2.0 LITERATURE REVIEW

2.1 Dizziness

2.2 Types of dizziness

Dizziness can be further divided into 4 types of categories, which are presyncope, vertigo, disequilibrium and lightheadedness (Drachman, 1998; Post and Dickerson, 2010). The type of dizziness was listed in Table 2.1.

Table 2.1: Types of dizziness

Category	Characteristics
Presyncope	Sensation of impending faint or loss of consciousness
Vertigo	Illusion of movement of rotatory of oneself or the environment
Disequilibrium	Postural of instability and gait imbalance
Lightheadedness	Non-specific symptoms, feeling disconnected to the environment

2.2.1 Presyncope

Presyncope is defined as sensation of impending faintness and loss of consciousness. It usually occurs when a patient is rising up from sitting or lying position, and it worsen especially during the morning. This feeling of dizziness would not happen if patient was in a supine position. Causes of this type of dizziness are orthostatic hypotension, autonomic dysfunction due to diabetes and cardiovascular diseases such as myocardial infarction, arrythrymias and carotid artery stenosis (Gupta and Lipsitz, 2007). Medications like anti-hypertensive and anti-arrthyrmic drugs also can sometimes cause presyncope (Lee, 2012).

2.2.2 Vertigo

Vertigo is a hallucination of movement, it is typically rotary movement, but not in every cases. This type of dizziness was caused by abnormalities or disruption in the vestibular system, which is responsible for to keep the central nervous system informed of head's position in space, its relation to the gravitational forces and its accelerations in various planes (Samuels and Harris, 2013).

2.2.3 Disequilibrium

It is defined as impaired balance and gait without abnormal head sensation. The patient may have a feeling of unsteadiness but with no sensation of head movement or a sense of faintness. Ageing process causes multiple sensory deficits that impair balance system. Other causes of disequilibrium includes peripheral neuropathy, musculoskeletal disorder, gait disorder and Parkinson disease. If the patient have gait disorder and complaints of disequilibrium at the same time, a central cause like cerebellar problem can be suspected and should be referred for neurological evaluation (Lee, 2012).

2.2.4 Lightheadedness

Non-specific lightheadedness involved vague symptoms like giddiness and wooziness, and a feeling of disconnected to the environment. This form of dizziness was the most common in patients. The most important aspect in this type of dizziness is that, the patient never actually falls or veers. The causes are hyperventilation, hypoglycaemia, anemia, head trauma and also psychogenic disorder like anxiety, depression and phobia (Staab and Ruckenstein, 2007; Ruckenstein and Staab, 2009).

2.3 Prevalence of dizziness

Nowadays, there is a significant number of dizziness and vertigo patients who came to hospital to seek for treatment. Population studies done by a few researchers shows that migraine, dizziness and vertigo are all common in the general population, affecting 13%, 20-30% and 5-10% respectively (Karatas, 2008; Lempert and Neuhauser, 2009; Victor *et al.*, 2010)

2.4 Dizziness in Emergency Department

It is estimated that primary care physicians care for more than one half of all patients with dizziness (Schappert and Burt, 2006). Dizziness is the main presenting symptom in about 3% of primary care visits for patients 25 years old and older, and in nearly 3% of all emergency department visits (Sloane, 1989; Kerber *et al.*, 2008).

2.5 Impacts of Dizziness

Dizziness and vertigo patient had significant burden in their daily lives as it causes of loss of independent mobility (Beers *et al.*, 2006). It can also become the direct cause of falls-related injuries than environmental factors (Svensson *et al.*, 1991) .Thus, it is an important healthcare issue that need to be addressed and managed effectively.

Previous literatures also shows that dizziness greatly affect the quality of life of patients. From the study in year 2008 by (Skøien *et al.*, 2008), it was revealed that dizziness or vertigo were the infrequent cause of long-term sickness absence in which the annual incidence for women of 7.5/10000 at risk, while on the other hand, the annual incidence for men was 3.2/10000 at risk. There were 694 women and 326 men that were included in the study. It was observed that disability pension was obtained by 23% of the women and 24% of the men representing a quarter of the sample. One third of older people fall each year and the number of falls increases with age and frailty level (WHO, 2007). Of all falls in older adults, 10-20% results in injury, hospitalisation and/or death (Rubenstein, 2006).

2.6 Age and Gender

A study done in Brazil shows that among individuals who reported of dizziness, 94% of them were adults or elderly that consist of 196548 individuals, and 63% of them were female. It is estimated that out of a population of 19442871, 209025 individuals complaints of dizziness as the most prevalent symptom in the assessed month (Martins *et al.*, 2016). Bittar et al in 2013 established prevalence of dizziness of 42% in a study carried out in the city of Sao Paolo, Brazil, which was a higher proportion than that was found in other study. Another study done in Malaysia also shows that out of 100 patients, 88% of them were above 40 years old (Philip and Prepageran, 2009).

Prevalence of dizziness also increases as age increases. Study done by De Moraes et al in the year of 2013 showed that from a sample of 391 participants, 45% of them (n=176) reported of having dizziness in the elderly population that consists of participants from 65 years old and above (De Moraes *et al.*, 2013). In the same study by Martins et al in the year of 2016, it was observed that prevalence of dizziness increases in direct proportion with age, with a peak of 71 and 80 years old. It shows that elderly have 1.111-fold higher chance of having dizziness as the main health problem compared to adult group. The findings of higher prevalence of dizziness in the elderly ages agree with several worldwide literature reports and can be explained by the ageing process of the balance system, multisensory deficits, which are common in elderly patients and accumulation of comorbidities such as cardiovascular, metabolic and neurological diseases. In a study performed in the University Hospital of Zurich, Switzerland, with 266 individuals with dizziness, older than 65 years old, 36.7% of them were diagnosed with multisensory dizziness which reinforces the impact of aging on the increasing prevalence of this symptom (Geser and Straumann, 2012).

The study performed by Martins TF et al also shows that among the individuals who reported of dizziness, 63% of them were females that comprises of 131,686 individuals in the state of Minas Gerais. The prevalence of dizziness in females have been reported in several studies, which can be explained by hormonal variations responsible for ovarian cycle and menopause, higher prevalence of migraine and the fact that more women seek medical care compared to men (Tiensoli *et al.*, 2004). A population epidemiological study done in the city of Sao Paolo revealed that from a sample of 1960 participants, 52% of them, which were women, were often affected by dizziness compared to men that comprises of 31%, at the ratio of 1.67 to 1. This study also

showed that more women that is represented by 51% seek treatment or medical care due to dizziness at a much higher percentage than men that only comprises of 37%. However, this findings do not show that although the number of women seeking medical care is much higher, that is not the reason of why the symptom of dizziness is more common in females since the respondents are randomly chosen (Bittar *et al.*, 2013).

2.7 Current Situation

In Malaysia, a study was carried out by Phillip and Prepageren in the year of 2009 on the vertigo and dizziness patients. This retrospective study reviewed the case records of vertigo and dizziness patients who came to the department of 2 years period of time which were from 2004 until 2006. The patients were mostly referred from ENT Clinic and Neurosurgical Clinic of University Malaya Medical Centre (UMMC) and also ENT Clinics from Klang Valley regions. The clinic was set up in year of 2004 that manages cases that need a thorough and systematic evaluation from medicals, paediatrics, neurosurgical, psychiatrics and ENT Clinics who need the further examination for dizziness problem. This study was conducted among 100 vertigo patients who came to Neurotology Clinic in University Malaya Medical Centre.

The study revealed that most of the patients are above the age of 40 years old that comprises of 88% from total patients. The patients that involved in the study were 49 males and 51 females. They are from different races, which are 43 patients were Chinese, 29 patients were Indians and last but not least there were 28 Malays patients.

In addition, the study also showed that the most common cause of dizziness is caused by peripheral vestibular disease (PVD) that accounts for 66% from total patients. Among the PVD, the highest number of causes is from Benign Paroxysmal Positional Vertigo (BPPV) which is 31%, followed by Recurrent Vestibulopathy (RV) with the percentage of 29%, 27 cases of idiopathic cases, Meniere's disease and central causes in the order of frequency.

For the last category, which was "others", there were 4 cases which is due to psychogenic disorder, high frequency hearing loss, post-traumatic dizziness and lastly, due to central cause which was posterior fossa tumour.

On the other hand, in another study done by Zuraida Zainun, Mohd Normani Zakaria, which Din Suhaimi Sidek and Nursuhana Nordin in the year of 2009 revealed that 22% of patients who came to Vertigo Clinic had diagnosis of BPPV, followed by 16.5% of them are suffering from Meniere's Disease (Zainun et al; 2009).

Apart from that, a further prospective study was carried out on 65 Peripheral Vestibular Disorder (PVD) patients in Otolaryngology-Head and Neck Surgery (ORL-HNS) Clinic, University Science Malaysia Hospital (Zainun et al, 2016).

This study aims to determine the pathology distribution of peripheral vestibular disordered patients in the clinic. The results showed that out of 65 subjects recruited, most of them are from the 4^{th} decade, Malay female patients. The highest number of cases was BPPV that made up of 29.2%.

Followed by the second highest number was PVD of unknown origin with 26.2% of cases, by Meniere's Disease (MD) with percentage of 21.5%, Vestibular Neuritis (VN) that proportionate of 18.5%, PVD of unknown origin with 26.2% of cases and last but not least, Vestibular Labyrinthitis (VL) comprises of 4.6%. This study was in line with the previous Malaysian study that showed similar prevalence rate of Meniere's disease (Zainun et al, 2016).